Claims

1. Computer-based system for automated experience rating and/or loss reserving, a certain event P_{if} of an initial time interval i including development values P_{ikf} of the development intervals k=1,...,K, K being the last known development interval with i=1, ..., K, and all development values P_{1kf} being known, characterized

in that the system for automated determination of the development values $P_{i,K+2-i,f},\ldots,P_{i,K,f}$ comprises at least one neural network.

2. Computer-based system according to claim 1, characterized in that for the events the initial time interval corresponds to an initial year, and the development intervals correspond to development years.

3. Computer-based system according to one of the claims 1 or 2, characterized in that the system for determination of the development values $P_{i,K+2-i,f},\ldots,P_{i,K,f}$ of an event $P_{i,f}(i-1)$ comprises iteratively generated neural networks $N_{i,j}$ for each initial time interval i with $j=1,\ldots,(i-1)$, the neural network $N_{i,j+1}$ depending recursively on the neural network $N_{i,j}$.

4. Computer-based system according to one of the claims 1 to 3, characterized in that training values for weighting a particular neural network N_{ij} comprise the development values $P_{p,q,f}$ with $p=1,\ldots,(i-1)$ and $q=1,\ldots,K-(i-j)$.

5. Computer-based system according to one of the claims 1 to 3, characterized in that the neural networks N_{ij} for the same j are identical, the neural network $N_{i+1,,j=i}$ being generated for an initial time interval i+1, and all other neural networks $N_{i+1,,j<i}$ corresponding to networks of earlier initial time intervals.

6. Computer-based system according to one of the claims 1 to 5, characterized in that the system further comprises events $P_{i,f}$ with initial time interval i<1, all development values $P_{i<1,k,f}$ being known for the events $P_{i<1,f}$.

7. Computer-based system according to one of the claims 1 to 6, characterized in that the system comprises at least one scaling factor by means of which the development values P_{ikf} of the different events $P_{i,f}$ are scalable according to their initial time interval.

8. Computer-based method for automated experience rating and/or loss reserving, development values P_{ikf} with development intervals $k=1,\ldots,K$ being assigned to a certain event P_{if} of an initial time interval i, K being the last known development interval with i=1, ..., K, and all development values P_{1kf} being known for the events $P_{1,f}$, characterized

in that at least one neural network is used for determination of the development values $P_{i,K+2-i,f},\ldots,P_{i,K,f}$.

9. Computer-based method according to claim 8, characterized in that for the events the initial time interval is assigned to the initial year, and the development intervals are assigned to development years.

10. Computer-based method according to one of the claims 8 or 9, characterized in that for determination of the development values $P_{i,K-(i-j)+1,f}$, neural networks $N_{i,j}$ are generated iteratively (i-1) for each initial time interval i with $j=1,\ldots,(i-1)$, the neural network $N_{i,j+1}$ depending recursively on the neural network $N_{i,j}$.

11. Computer-based method according to one of the claims 8 to 10, characterized in that for weighting a particular neural network $N_{i,j}$, the development values $P_{p,q,f}$ with $p=1,\ldots,(i-1)$ and $q=1,\ldots,K-(i-j)$ are used.

12. Computer-based method according to one of the claims 8 to 10, characterized in that the neural networks $N_{i,j}$ for same j are trained identically, the neural network $N_{i+1,,j=i}$ being generated for an initial time interval i+1, and all other neural networks $N_{i+1,,j<i}$ of earlier initial time intervals being taken over.

13. Computer-based method according to one of the claims 8 to 12, characterized in that used in addition for determination are events $P_{i,f}$ with initial time interval i<1, all development values $P_{i<1,k,f}$ being known for the events $P_{i<1,f}$.

14. Computer-based method according to one of the claims 8 to 13, characterized in that by means of at least one scaling factor the development values P_{ikf} of the different events $P_{i,f}$ are scaled according to their initial time interval.

15. Computer-based method for automated experience rating and/or loss reserving, development values $P_{i,k,f}$ with development intervals k=1,...,K being stored assigned to a certain event $P_{i,f}$ of an initial time interval i, whereby i=1,..,K and K is the last known development interval, and whereby all development values $P_{1,k,f}$ are known for the first initial time interval, characterized

in that, in a first step, for each initial time interval i=2,..,K, by means of iterations j=1,..,(i-1), at each iteration j, a neural network $N_{i,j}$ is generated with an input layer with K-(i-j) input segments and an output layer, each input segment comprising at least one input neuron and being assigned to a development value $P_{i,k,f}$,

in that, in a second step, the neural network $N_{i,j}$ is weighted with the available events $P_{i,f}$ of all initial time intervals m=1,..,(i-1) by means of the development values $P_{m,1..K-(i-j),f}$ as input and $P_{m,1..K-(i-j)+1,f}$ as output, and

in that, in a third step, by means of the neural network $N_{i,j}$ the output values $O_{i,f}$ for all events $P_{i,f}$ of the initial year i are determined, the output value $O_{i,f}$ being assigned to the development value $P_{i,K-(i-j)+1,f}$ of the event $P_{i,f}$, and the neural network $N_{i,j}$ depending recursively on the neural network $N_{i,j+1}$.

16. Computer-based method according to claim 15, characterized in that for the events the initial time interval is assigned to an initial year, and the development intervals are assigned to development years.

17. System of neural networks, which neural networks N_i each comprise an input layer with at least one input segment and an output layer, the input layer and output layer comprising a multiplicity of neurons which are connected to one another in a weighted way, characterized

in that the neural networks N_i are able to be generated iteratively using software and/or hardware by means of a data processing unit, a neural network N_{i+1} depending recursively on the neural network N_i, and each network N_{i+1} comprising in each case one input segment more than the network N_i,

in that, beginning at the neural network N_1, each neural network N_i is trainable by means of a minimization module by minimizing a locally propagated error, and

in that the recursive system of neural networks is trainable by means of a minimization module by minimizing a globally propagated error based on the local error of the neural network N_i.

18. System of neural networks according to claim 17, characterized in that the output layer of the neural network N_i is connected to at least one input segment of the input layer of the neural network N_{i+1} in an assigned way.

19. Computer program product which comprises a computer-readable medium with computer program code means contained therein for control of one or more processors of a computer-based system for automated experience rating and/or loss reserving, development values $P_{i,k,f}$ with development intervals k=1,..,K being stored assigned to a certain event $P_{i,f}$ of an initial time interval i, whereby i=1,..,K, and K is the last known development interval, and all development values $P_{1,k,f}$ being known for the first initial time interval i=1, characterized

in that by means of the computer program product at least one neural network is able to be generated using software and is usable for determination of the development values $P_{i,K+2-i,f}, \ldots, P_{i,K,f}$.

20. Computer program product according to claim 19, characterized in that for the events the initial time interval is assigned to an initial year, and the development intervals are assigned to development years.

21. Computer program product according to one of the claims 19 or 20, characterized in that for determination of the development values $P_{i,K-(i-j)+1,f}$ neural networks $N_{i,j}$ are able to be generated iteratively (i-1) for each initial time interval i by means of the computer program product, the neural network $N_{i,,j+1}$ depending recursively on the neural network $N_{i,j}$.

22. Computer program product according to one of the claims 19 to 21, characterized in that for weighting a particular neural network $N_{i,j}$ by means of the computer program product the development values $P_{p,q,f}$ with p=1,...,(i-1) and q=1,...,K-(i-j) are readable from a database.

23. Computer program product according to one of the claims 19 to 21, characterized in that with the computer program product the neural networks $N_{i,j}$ are trained identically for the same j, the neural network $N_{i+1,j=i}$ being generated for an initial time interval i+1 by means of the computer program product, and all other neural networks $N_{i+1,j<i}$ of earlier initial intervals being taken over.

24. Computer program product according to one of the claims 19 to 23, characterized in that the database additionally comprises in a stored way events $P_{i,f}$ with initial time interval i<1, all development values $P_{i<1,k,f}$ being known for the events $P_{i<1,f}$.

25. Computer program product according to one of the claims 19 to 24, characterized in that the computer program product comprises at least one scaling factor by means of which the development values P_{ikf} of the different events $P_{i,f}$ are scalable according to their initial time interval.

26. Computer program product which is loadable in the internal memory of a digital computer and comprises software code segments with which the steps according to one of the claims 8 to 16 are able to be carried out

when the product is running on a computer, the neural networks being able to be generated through software and/or hardware.